COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Tidewater Regional Office

STATEMENT OF LEGAL AND FACTUAL BASIS

Hampton University
Hampton, Virginia
Permit No. TRO-60106
Permit Effective Date: June 21, 2004

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Hampton University has applied for a Title V Operating Permit for its Hampton facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact:_____ Date:_____

Air Permit Manager:_____ Date:_____

Regional Director:_____ Date:_____

FACILITY INFORMATION

Permittee
Hampton University
E. Queen Street
Hampton, Virginia 23668

Facility
Hampton University
E. Queen Street
Hampton, Virginia

AFS ID No.: 51-650-00010

SOURCE DESCRIPTION

SIC Code: 8221 - Hampton University is a co-educational institution of higher education located at E. Queen Street off of Interstate 64 near downtown Hampton, Virginia. The university operates a steam plant that supplies heat to the university's academic buildings, dormitories, and other campus buildings. The steam plant consists of six (6) boilers - two (2) coal-fired units each rated at 34 million Btu/hr, three (3) distillate oil-fired units, rated at 19, 23, and 28 million Btu/hr respectively, and one (1) paper/wood pellet-fired unit rated at 4 million Btu/hr. All of the steam plant units were constructed prior to 1972. The university also maintains on site a dry cleaning operation rated at 55 lbs/load and a natural gas/distillate oil-fired boiler at the University Laundry rated at 4.184 million Btu/hr. The university also maintains two (2) natural gas/distillate oil-fired boilers, one rated at 3.348 million Btu/hr and the other rated at 3.313 million Btu/hr, at the E. Queen Street Dormitory and one (1) 600 kW diesel-fired emergency electric generator located at the university's museum.

The facility is a Title V major source of SO_2, NO_x, PM, CO, and HAPs. This source is located in an attainment area for all pollutants, and is a PSD minor source. The facility was previously permitted under a Federal Operating Permit issued on June 21, 1999.

COMPLIANCE STATUS

A full compliance evaluation of this facility, including a site visit, has been conducted. In addition, all reports and other data required by permit conditions or regulations, which are submitted to DEQ, are evaluated for compliance. Based on these compliance evaluations, the facility has not been found to be in violation of any state or federal applicable requirements at this time.

EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The emissions units at this facility consist of the following:

Emission Unit ID	Stack ID	Emission Unit Description	Size/Rated Capacity (million Btu/hour)*	Pollution Control Device (PCD) Description	PCD ID	Pollutant Controlled
1	ST-1	Riley Stoker Boiler (pre-1972), coal-fired	34	n/a	n/a	n/a
2	ST-1	Riley Stoker Boiler (pre-1972), coal-fired	34	n/a	n/a	n/a
3	ST-1	Riley Boiler (pre-1972), diesel oil-fired	19	n/a	n/a	n/a
4	ST-1	Keeler Boiler (pre-1972), diesel oil-fired	23	n/a	n/a	n/a
5	ST-1	Keeler Boiler (pre-1972), diesel oil-fired	28	n/a	n/a	n/a
6	ST-1	Hurst Boiler (Model No. F 650; pre-1972), paper pellet/wood chip-fired	4	Hurst Settling Chamber	n/a	PM
7	ST-2	Cleaver Brooks Boiler (Model No. CB.200-100; installed 1985), natural gas/diesel oil-fired	4.184	n/a	n/a	n/a
8	ST-3	Burnham Boiler (Model No. 4 FL.360.A.45.LB; installed 1984), natural gas/diesel oil-fired	3.348	n/a	n/a	n/a
9	ST-4	Kewanee Boiler (Model No. M-265-KO; installed 1977), natural gas/diesel oil-fired	3.313	n/a	n/a	n/a
EG-23	EG-23	Caterpillar Emergency Generator (located at the university's museum, installed 1997), diesel oil-fired	600 kW (896 BHP)	n/a	n/a	n/a
10	n/a	Dry Cleaning (Hoffman New Yorker Model #2010, dry-to-dry machine, unit manufactured in 1993)	55 lbs soiled clothing/load	Condenser rated at ~95-99% design control efficiency	n/a	VOC

*The Size/Rated capacity is provided for informational purposes only and is not an applicable requirement.

EMISSIONS INVENTORY

A copy of the 2002 annual emission update is attached. Emissions are summarized in the following tables.

2002 Actual Emissions

	2002 Criteria Pollutant Emission in Tons/Year				
	VOC	CO	SO_2	PM_{10}	NO_x
Facilitywide	2.1	-	69.1	-	34.9

2002 Facility Hazardous Air Pollutant Emissions

Pollutant	2002 Hazardous Air Pollutant Emission in Tons/Yr
Perchloroethylene CAS #127-18-4	2.1

EMISSION UNIT APPLICABLE REQUIREMENTS - Emission Units 1 through 9, EG-23, and Emission Unit 10

Limitations

Emission units 1 through 9 are small boilers. Emission unit EG-23 is a 600 kW emergency diesel generator. Units 1 through 9 are all of pre-1972 construction and, as such, are subject only to the existing source rules for opacity (Chapter 40, Rule 4-1) and SO_2 and PM (Chapter 40, Rule 4-4). The opacity standard for the boilers is 20% except for one six-minute period in any hour where the opacity can be as high as 60%.

Particulate emissions are based on the existing source rules as specified in 9 VAC 5-40-900. The PM emissions from units 1 through 9 combined shall not exceed the following equation: $E = 1.0906H^{-0.2594}$, where H is the total combined capacity in 10^6 Btus per hour and E is the maximum allowable emission rate in pounds per million Btu.

Particulate emissions from each individual boiler (Units 1 through 9) are based on the product of the unit's rated capacity and the fuel burning installation's particulate emission ratio as determined above.

Sulfur dioxide emissions from the boilers combined (Units 1 through 9) are expressed according to the following equation from 9 VAC 5-40-930: $S = 2.64K$, where S = the allowable emission of sulfur dioxide expressed in lbs per hour and K = the heat input at total capacity expressed in 10^6 Btus per hour.

Emission Unit EG-23 is a 600 kW emergency diesel generator. This generator was previously on the insignificant list but due to its size, it is now considered significant. The only applicable requirement for the generator is an opacity requirement from 9 VAC 5-50-80 of 20% opacity except during one six-minute period in any one hour in which visible emissions shall not exceed 30% opacity.

The facility also has a dry cleaning facility (Unit 10) which is subject to 40 CFR 63 Subpart M. The Subpart M requirements have been included for the facility. The facility uses less than 2,100 gallons of perchloroethylene per year, therefore, the dry cleaning operation is not subject to the full requirements of Subpart M.

Monitoring

No monitoring of the boiler (Units 1 through 9) SO_2 and PM emissions is necessary. For PM emissions, the facilitywide PM emission limitation ratio is based on the equation:

$$E = 1.0906H^{-0.2594}$$

Based on this equation, the combined heat input capacity of Units 1 through 9 equals 152.845 x 10^6 Btus per hour. Therefore, the maximum allowable emission ratio for the boilers is 0.296 lbs per million Btu. The attached calculations demonstrate compliance with this limitation for the combined boilers and for the individual boilers.

SO_2 emission limitations are based on the formula, S = 2.64K. K is the combined heat input capacity of the boilers of 152.845 x 10^6 Btus per hour. Therefore, the combined SO_2 emission limitation for the boilers is 403.5 lbs per hour. The attached calculations demonstrate compliance with this limitation for the combined boilers using typical facility fuel sulfur contents.

For opacity, the permittee is required to make weekly visual evaluations of the common stack of Units 1 through 6 and to record any results in a logbook. For the individual stacks of Units 7, 8, and 9, the permittee is required to make weekly visual evaluations of the stacks only when firing distillate oil. Units 7, 8, and 9 rarely fire distillate oil. These units normally fire natural gas and the presence of visible emissions when firing natural gas is not typical of these units. Unit EG-23 is required to undergo a monthly visible emission observation during monthly testing.

The boilers have been given a maximum sulfur limit for coal of 2.43%. This limitation has been established since it would require a coal sulfur content of greater than 2.43% by weight to exceed the SO_2 emission limitations. Typically, the facility utilizes coal in the 1.0-% sulfur range. No distillate oil sulfur limit was established because a distillate oil sulfur content of greater than approximately 2.5% would be required to exceed the SO_2 emission limitations. It is considered unreasonable to assume that the facility would ever use distillate fuel oil of this sulfur content. In addition, the permittee will perform a stack test for PM and SO_2 from the two coal-fired boilers once every five years to demonstrate continued compliance with these limitations and continued boiler efficiency.

The dry cleaning operation (Unit 10) is subject to operational practice requirements of 40 CFR 63 Subpart M. These requirements have been included in the permit. The permittee has been given the option of calculating total facilitywide perchloroethylene consumption only once per calendar year. The major source threshold for Subpart M is 2,100 gallons of perchloroethylene per year. However, historically, the facility has used less than 300 gallons per year and the facility would have to be expanded by several dry cleaning units of equal capacity to even approach this threshold. Therefore, the source is permitted to take an annual inventory of perchloroethylene consumption once per calendar year to be completed by December 31 of each year. If any annual inventory determines that perchloroethylene consumption has exceeded 1,575 gallons (75% of the 2,100-gallon per year threshold), the facility is required to resume monthly calculation of annual throughput calculated as the sum of each consecutive 12-month period.

Recordkeeping
The permit includes requirements for maintaining records of all monitoring and testing required by the permit. These records include fuel quality records, visible emission evaluation records, and stack test records. The permit also includes all recordkeeping requirements for the dry cleaning operation (Unit 10) as specified by 40 CFR 63 Subpart M.

Testing

The permit requires a source stack test for the two coal-fired boilers (Units 1 and 2) once every 5 years to demonstrate compliance with the PM and SO_2 emission limitations. The previous permit had an annual stack testing requirement for these two boilers. However, based on the relatively small sizes of the units (34 mmBtu per hour each), it was determined that an annual stack test was overly stringent. A table of test methods has been included in the permit if testing is performed. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

GENERAL CONDITIONS

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal-operating permitted sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

INAPPLICABLE REQUIREMENTS

NSPS Subpart Dc does not apply to the boilers since they are all of pre-1972 construction.

INSIGNIFICANT EMISSION UNITS

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

Insignificant emission units include the following:

Emission Unit No.	Emission Unit Description	Citation	Pollutant(s) Emitted (9 VAC 5-80-720 B)	Rated Capacity (9 VAC 5-80-720 C)
EG-1	Onan Generator, standby (Cafeteria)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	15 kW (natural gas)

EG-2	Onan Generator, standby (McGrew Towers)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	125 kW (natural gas)
EG-3	Onan Generator, standby (Armstrong Hall)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	75 kW (natural gas)
EG-4	Onan Generator, standby (Queen Street Dormitory)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	30 kW (diesel fuel)
EG-5	Onan Generator, standby (Whipple Barn)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	35 kW (natural gas)
EG-6	Onan Generator, standby (Science Tech)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	125 kW (diesel fuel)
EG-7	Kohler Generator, standby (DuBois Hall)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	75 kW (natural gas)
EG-8	Onan Generator, standby (Stone Building)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	45 kW (natural gas)
EG-9	Onan Generator, standby (Ogden Hall/Mansion House)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	100 kW (natural gas)
EG-10	Onan Generator, standby (Marine Science)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	30 kW (natural gas)
EG-11	Caterpillar Generator, standby (Wilder Hall)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	225 kW (diesel fuel)
EG-12	Onan Generator, standby (Infirmary)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	7.5 kW (natural gas)
EG-13	Generac Generator, standby (Pump Station)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	32 kW (diesel fuel)

EG-14	Onan Generator, standby (Convocation Center)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	230 kW (diesel fuel)
EG-15	Delco Generator, standby (Steam Plant)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	100 kW (diesel fuel)
EG-16	Onan Generator, standby (Mobile Unit)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	150 kW (diesel fuel)
EG-17	Onan Generator, standby (Computer Center)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	75 kW (natural gas)
EG-18	Caterpillar Generator, standby (Harvey Library)	5-80-720 C.4.b.	CO, NOx, VOC, SO_2, PM	225 kW (diesel fuel)
EG-19	Kohler Generator, standby (Holland Hall)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	75 kW (natural gas)
EG-20	Onan Generator, standby (Olin Engineering)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	75 kW (natural gas)
EG-21	Kohler Generator, standby (Early Childhood)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	25 kW (natural gas)
EG-22	Kohler Generator, standby (Turner Hall)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	70 kW (natural gas)
EG-24	Generac Generator (Student Center)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	180 kW (diesel)
EG-25	Onan Generator (Scripps Howard)	5-80-720 C.4.c.	CO, NOx, VOC, SO_2, PM	40 kW (natural gas)

CH-1	Coal Handling and Storage Facility	5-80-720 B.1.	PM	NA
S-1	Paper Pellet Silo	5-80-720 B.1.	PM	340 lbs/hr
S-2	Ash silo and load-out facility	5-80-720 B.1.	PM	40 tons; dimensions: 15 ft. diameter, 30 ft. height
T-1	Diesel oil storage tank (installed before 1972)	5-80-720 B.1.	VOC	25,000 gallons
T-2	Diesel oil storage tank (installed before 1972)	5-80-720 B.1.	VOC	20,000 gallons
T-3	Diesel oil storage tank (installed before 1972)	5-80-720 B.1.	VOC	20,000 gallons
T-4	Diesel oil storage tank (installed before 1972)	5-80-720 B.1.	VOC	1,000 gallons
PEL-1	Pelletizing Facility	5-80-720 B.1.	PM	340 lbs/hour

[1]The citation criteria for insignificant activities are as follows:
9 VAC 5-80-720 A - Listed Insignificant Activity, Not Included in Permit Application
9 VAC 5-80-720 B - Insignificant due to emission levels
9 VAC 5-80-720 C - Insignificant due to size or production rate

CONFIDENTIAL INFORMATION

The permittee did not submit a request for confidentiality. All portions of the Title V application are suitable for public review.

PUBLIC PARTICIPATION

The proposed permit will be placed on public notice in the Newport News *Daily Press* from April 17, 2004 to May 17, 2004.

HAMPTON UNIVERSITY
TITLE V BOILER EMISSIONS SUMMARY
DEMONSTRATION OF COMPLIANCE WITH PM AND SO2 LIMITATIONS

ATTACHMENT A TO STATEMENT OF LEGAL AND FACTUAL BASIS

I. PARTICULATE EMISSION LIMITATIONS

No monitoring of the boiler (Units 1 through 9) SO_2 and PM emissions is necessary. For PM emissions, the facilitywide PM emission limitation ratio for the boilers is based on the equation:

$$E = 1.0906H^{-0.2594}$$

Based on this equation from 9 VAC 5-40-900, the combined heat input capacity of Units 1 through 9 (H) equals 152.845 x 10^6 Btus per hour. Therefore, the maximum allowable emission ratio for the boilers is **0.296 lbs per million Btu**.

Maximum Hourly PM Emissions per Boiler

Boiler 1	8.93 lbs/hr
Boiler 2	8.93 lbs/hr
Boiler 3	0.14 lbs/hr
Boiler 4	0.17 lbs/hr
Boiler 5	0.20 lbs/hr
Boiler 6	0.30 lbs/hr
Boiler 7	0.03 lbs/hr
Boiler 8	0.03 lbs/hr
TOTAL	18.7 lbs/hr

Therefore, 18.7 lbs/152.845 million Btu/hr = **0.1225 lbs/mmBtu** which is well below the combined boiler emission limitation of 0.296 lbs/mmBtu as specified in 9 VAC 5-40-900.

Particulate emissions from each individual boiler (Units 1 through 9) are based on the product of the unit's rated capacity and the fuel burning installation's particulate emission ratio as determined above. Therefore, particulate emission limitations for each individual boiler shall not exceed the following:

UNIT	CALCULATED LIMITATIONS (9 VAC 5-40-900)	MAX. EMISSIONS
Boiler 1	34 mmBtu/hr x 0.296 lbs/mmBtu = 10.06 lbs/hr	8.93 lbs/hr
Boiler 2	34 mmBtu/hr x 0.296 lbs/mmBtu = 10.06 lbs/hr	8.93 lbs/hr
Boiler 3	19 mmBtu/hr x 0.296 lbs/mmBtu = 5.62 lbs/hr	0.14 lbs/hr
Boiler 4	23 mmBtu/hr x 0.296 lbs/mmBtu = 6.81 lbs/hr	0.17 lbs/hr
Boiler 5	28 mmBtu/hr x 0.296 lbs/mmBtu = 8.29 lbs/hr	0.20 lbs/hr
Boiler 6	4 mmBtu/hr x 0.296 lbs/mmBtu = 1.18 lbs/hr	0.30 lbs/hr

UNIT	CALCULATED LIMITATIONS (9 VAC 5-40-900)	MAX. EMISSIONS
Boiler 7	4.184 mmBtu/hr x 0.296 lbs/mmBtu = 1.24 lbs/hr	0.03 lbs/hr
Boiler 8	3.348 mmBtu/hr x 0.296 lbs/mmBtu = 0.99 lbs/hr	0.03 lbs/hr

Based on the above calculations, at maximum operating capacity the source remains well within compliance with established PM emission limitations.

II. SULFUR DIOXIDE (SO_2) EMISSION LIMITATIONS

Sulfur dioxide emission limitations for the combined boilers (Units 1 through 9) are expressed according to the following equation from 9 VAC 5-40-930:

S = 2.64K, where S = the allowable emission of sulfur dioxide expressed in lbs per hour and K = the heat input at total capacity expressed in 10^6 Btus per hour.

In this case, **S = 2.64 x 152.845 = 403.5 lbs SO_2/hr**

Based on emission calculations utilizing AP-42 emission factors and the combined maximum heat input capacities of the boilers, the maximum expected emission of SO_2 from the combined boilers is as follows:

Maximum Hourly SO_2 Emissions per Boiler

Boiler 1	38 lbs/hr
Boiler 2	38 lbs/hr
Boiler 3	3.92 lbs/hr
Boiler 4	4.74 lbs/hr
Boiler 5	5.77 lbs/hr
Boiler 6	0.10 lbs/hr
Boiler 7	0.86 lbs/hr
Boiler 8	0.70 lbs/hr
TOTAL	92.09 lbs/hr

The **maximum calculated hourly combined emission rate of SO_2 of 92.09 lbs/hr** from the boilers (Units 1 through 9) is well below the maximum allowable hourly SO_2 emission limitation of 403.5 lbs/hour.

III. CONCLUSION

In summary, the above calculations demonstrate with reasonable certainty that, at maximum design heat input capacity, the boilers will not exceed the maximum emission limitations for PM and SO_2 as referenced in 9 VAC 5-40-900 and 9 VAC 5-40-930. It is believed that weekly opacity monitoring of all the boilers and a stack test once every five years for PM and SO_2 for the two coal-fired boilers (Units 1 and 2) is sufficient periodic monitoring to assure compliance with the established emission limitations for these units.

EMISSION FACTORS

Fuel	Units	PM	SO_2	Reference
Coal	Lbs/ton	15	31 S	AP-42, Sec. 1.1, 9/98
No. 2 Fuel Oil	Lbs/10^3 gal	2	142 S	AP-42, Sec. 1.3, 9/98
Paper Pellets	Lbs/MMBtu	0.40 (dry), 0.33 (wet)	0.025	AP-42, Sec. 1.6, 1/01
Natural Gas	Lbs/10^6 scf	7.6	0.6	AP-42, Sec. 1.4, 7/98

BOILER NO. 1 OR BOILER NO. 2

Boiler Capacity: 34 MMBtu/hr (per boiler)
Fuel: Coal (14,295 Btu/lb; 1.03% sulfur (typical))
Est.Max. Fuel Consumption Rate: 34 MMBtu/hr / 14,295 Btu/lb / 2000 lbs/ton = 1.19 tons coal/hr
Particulate matter settling effect: 50% for PM

PM Emissions:
1.19 tons/hr x 15 lbs/ton x (1-0.50) = 8.93 lbs/hr (<14.96 lbs/hr limit)
8.93 lbs/hr / 34 MMBtu/hr = 0.26 lbs/MMBtu (<0.44 lbs/MMBtu limit)

SO_2 Emissions:
1.19 tons/hr x 31 x 1.03 = 38 lbs/hr (<89.76 lbs/hr limit)

BOILER NO. 3

Boiler Capacity: 19 MMBtu/hr
Fuel: No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur (typical))
Est.Max. Fuel Consumption Rate: 19 MMBtu/hr / 138,000 Btu/gal = 138 gal/hr
Particulate matter settling effect: 50% for PM

PM Emissions:
138 gal/hr x 2 lbs/10^3 gal x (1-0.50) = 0.14 lbs/hr (<9.69 lbs/hr limit)
0.14 lbs/hr / 19 MMBtu/hr = 0.01 lbs/MMBtu (<0.51 lbs/MMBtu limit)

SO_2 Emissions:
138 gal/hr x 142 x 0.2 lbs/10^3 gal = 3.92 lbs/hr (<50.16 lbs/hr limit)

BOILER NO. 4

Boiler Capacity:	23 MMBtu/hr
Fuel:	No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur (typical))
Est.Max. Fuel Consumption Rate:	23 MMBtu/hr / 138,000 Btu/gal = 167 gal/hr
Particulate matter settling effect:	50% for PM

PM Emissions:

167 gal/hr x 2 lbs/10^3 gal x (1-0.50) = 0.17 lbs/hr (<11.04 lbs/hr limit)
0.17 lbs/hr / 23 MMBtu/hr = 0.01 lbs/MMBtu (<0.48 lbs/MMBtu limit)

SO_2 Emissions:

167 gal/hr x 142 x 0.2 lbs/10^3 gal = 4.74 lbs/hr (<60.72 lbs/hr limit)

BOILER NO. 5

Boiler Capacity:	28 MMBtu/hr
Fuel:	No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur (typical))
Est.Max. Fuel Consumption Rate:	28 MMBtu/hr / 138,000 Btu/gal = 203 gal/hr
Particulate matter settling effect:	50% for PM

PM Emissions:

203 gal/hr x 2 lbs/10^3 gal x (1-0.50) = 0.20 lbs/hr (<12.88 lbs/hr limit)
0.20 lbs/hr / 28 MMBtu/hr = 0.01 lbs/MMBtu (<0.46 lbs/MMBtu limit)

SO_2 Emissions:

203 gal/hr x 142 x 0.2 lbs/10^3 gal = 5.77 lbs/hr (<73.92 lbs/hr limit)

BOILER NO. 6

Boiler Capacity:	4 MMBtu/hr
Fuel:	Paper pellets

Settling Chamber Control efficiency: 81% for PM

PM Emissions:

4 MMBtu/hr x 0.40 lbs/MMBtu x (1-0.81) = 0.30 lbs/hr (dry) (<3.04 lbs/hr limit)
0.40 lbs/MMBtu emission factor (AP-42, Sec. 1.6) (<0.76 lbs/MMBtu limit)

SO_2 Emissions:

4 MMBtu/hr x 0.025 lbs/MMBtu = 0.10 lbs/hr (<10.56 lbs/hr limit)

BOILER NO. 7

Boiler Capacity:	4.184 MMBtu/hr
Main Fuel:	Natural Gas (1,000 Btu/cubic foot)
Backup Fuel:	No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur, typical)
Est.Max. Fuel Consumption Rate:	4,184 cf nat. gas/hr or 30.3 gal/hr fuel oil

PM Emissions, natural gas usage:

4,184 cf/hr x 7.6 lbs/10^6 cf = 0.03 lbs/hr (<3.138 lbs/hr limit)

0.03 lbs/hr / 4.184 MMBtu/hr = 0.01 lbs/MMBtu (<0.75 lbs/MMBtu limit)

PM Emissions, fuel oil usage:

30.3 gal/hr x 2 lbs/10^3 gal = 0.06 lbs/hr (<3.138 lbs/hr limit)

0.06 lbs/hr / 4.184 MMBtu/hr = 0.01 lbs/MMBtu (<0.75 lbs/MMBtu limit)

SO_2 Emissions, natural gas usage:

4,184 cf/hr x 0.6 lbs/10^6 cf = 0.003 lbs/hr (<11.05 lbs/hr limit)

SO_2 Emissions, fuel oil usage:

30.3 gal/hr x 142 x 0.2 lbs/10^3 gal = 0.86 lbs/hr (<11.05 lbs/hr limit)

BOILER NO. 8

Boiler Capacity:	3.348 MMBtu/hr
Main Fuel:	Natural Gas (1,000 Btu/cubic foot)
Backup Fuel:	No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur, typical)
Est.Max. Fuel Consumption Rate:	3,348 cf nat. gas/hr or 24.3 gal/hr fuel oil

PM Emissions, natural gas usage:

3,348 cf/hr x 7.6 lbs/10^6 cf = 0.03 lbs/hr (<2.68 lbs/hr limit)

0.03 lbs/hr / 3.348 MMBtu/hr = 0.01 lbs/MMBtu (<0.80 lbs/MMBtu limit)

PM Emissions, fuel oil usage:

24.3 gal/hr x 2 lbs/10^3 gal = 0.05 lbs/hr (<2.68 lbs/hr limit)

0.05 lbs/hr / 3.348 MMBtu/hr = 0.01 lbs/MMBtu (<0.80 lbs/MMBtu limit)

SO_2 Emissions, natural gas usage:

3,348 cf/hr x 0.6 lbs/10^6 cf = 0.002 lbs/hr (<8.84 lbs/hr limit)

SO_2 Emissions, fuel oil usage:

24.3 gal/hr x 142 x 0.2 lbs/10^3 gal = 0.70 lbs/hr (<8.84 lbs/hr limit)

BOILER NO. 9

Boiler Capacity:	3.313 MMBtu/hr
Main Fuel:	Natural Gas (1,000 Btu/cubic foot)
Backup Fuel:	No. 2 fuel oil (138,000 Btu/gal; 0.2% sulfur, typical)
Est.Max. Fuel Consumption Rate:	3,313 cf nat. gas/hr or 24 gal/hr fuel oil

PM Emissions, natural gas usage:

3,313 cf/hr x 7.6 lbs/10^6 cf = 0.03 lbs/hr (<2.65 lbs/hr limit)

0.03 lbs/hr / 3.313 MMBtu/hr = 0.01 lbs/MMBtu (<0.80 lbs/MMBtu limit)

PM Emissions, fuel oil usage:

24 gal/hr x 2 lbs/10^3 gal = 0.05 lbs/hr (<2.65 lbs/hr limit)

0.05 lbs/hr / 3.313 MMBtu/hr = 0.01 lbs/MMBtu (<0.80 lbs/MMBtu limit)

SO_2 Emissions, natural gas usage:

3,313 cf/hr x 0.6 lbs/10^6 cf = 0.002 lbs/hr (<8.75 lbs/hr limit)

SO_2 Emissions, fuel oil usage:

24 gal/hr x 142 x 0.2 lbs/10^3 gal = 0.70 lbs/hr (<8.75 lbs/hr limit)